

TABLE B-1. CBO BASELINE BUDGET AUTHORITY PROJECTIONS  
BY FUNCTION (By fiscal year, in billions of dollars)

Budget Function	1987 Base	Projections				
		1988	1989	1990	1991	1992
050 National Defense	284	302	316	330	345	361
150 International Affairs	16	18	23	20	20	21
250 General Science, Space, and Technology	12	11	11	12	12	13
270 Energy	5	6	7	7	7	7
300 Natural Resources and Environment	13	15	16	16	17	17
350 Agriculture	30	31	33	30	25	24
370 Commerce and Housing Credit	9	10	8	12	11	9
400 Transportation	27	30	30	31	32	33
450 Community and Regional Development	9	9	9	8	8	9
500 Education, Training, Employment, and Social Services	33	34	36	38	39	40
550 Health	41	45	48	52	57	61
570 Medicare	84	92	100	113	123	134
600 Income Security	158	168	175	183	216	219
650 Social Security						
On-budget	5	5	6	6	5	6
Off-budget	222	252	276	305	332	358
Subtotal	227	257	282	310	337	363
700 Veterans' Benefits and Services	27	28	28	29	29	30
750 Administration of Justice	8	9	9	9	9	10
800 General Government	7	7	7	8	8	8
850 General Purpose Fiscal Assistance	2	2	2	2	2	2
900 Net Interest						
On-budget	140	147	155	163	170	172
Off-budget	-5	-6	-9	-12	-15	-19
Subtotal	135	141	147	152	155	154
920 Allowances	0	1	3	5	8	10
950 Undistributed Offsetting Receipts						
On-budget	-32	-35	-36	-38	-41	-43
Off-budget	-3	-5	-6	-6	-7	-8
Subtotal	-35	-40	-42	-45	-48	-51
On-budget subtotal	878	934	987	1,034	1,104	1,144
Off-budget subtotal	214	241	262	287	310	331
Total	1,091	1,174	1,249	1,321	1,414	1,475

Source: Congressional Budget Office.

TABLE B-2. CBO BASELINE OUTLAY PROJECTIONS BY FUNCTION  
(By fiscal year, in billions of dollars)

Budget Function	1987 Base	Projections				
		1988	1989	1990	1991	1992
050 National Defense	280	290	303	317	332	346
150 International Affairs	13	16	16	16	16	17
250 General Science, Space, and Technology	9	11	11	12	12	12
270 Energy	3	5	5	5	5	6
300 Natural Resources and Environment	14	14	15	16	17	17
350 Agriculture	30	30	29	26	23	22
370 Commerce and Housing Credit	8	8	5	6	5	2
400 Transportation	25	28	29	30	31	31
450 Community and Regional Development	7	7	7	7	7	8
500 Education, Training, Employment, and Social Services	30	33	35	36	38	39
550 Health	41	44	48	52	56	61
570 Medicare	73	84	93	104	117	131
600 Income Security	124	131	139	145	154	163
650 Social Security						
On-budget	5	5	6	6	5	6
Off-budget	203	216	230	247	265	283
Subtotal	208	221	236	252	270	288
700 Veterans' Benefits and Services	26	27	28	28	29	29
750 Administration of Justice	8	9	9	9	10	10
800 General Government	7	7	7	7	8	8
850 General Purpose Fiscal Assistance	2	2	2	2	2	2
900 Net Interest						
On-budget	140	147	155	163	170	172
Off-budget	-5	-6	-9	-12	-15	-19
Subtotal	135	141	147	152	155	154
920 Allowances	0	1	3	5	8	11
950 Undistributed Offsetting Receipts						
On-budget	-32	-35	-36	-38	-41	-43
Off-budget	-3	-5	-6	-6	-7	-8
Subtotal	-35	-40	-42	-45	-48	-51
On-budget subtotal	814	865	908	956	1,004	1,049
Off-budget subtotal	195	205	216	229	243	256
Total	1,008	1,069	1,124	1,184	1,247	1,305

Source: Congressional Budget Office.

TABLE B-3. CBO BASELINE CREDIT PROJECTIONS BY BUDGET FUNCTION (By fiscal year, in billions of dollars)

Budget Function			1986 Actual	1987 Base	Projections				
					1988	1989	1990	1991	1992
050	Defense	DL	1	0	0	0	0	0	0
150	International Affairs	DL	8	7	7	8	8	8	9
		PG	6	12	12	13	13	14	14
270	Energy	DL	3	3	2	3	3	3	3
		PG	0	2	0	0	0	0	0
300	Natural Resources and Environment	DL	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>
350	Agriculture	DL	21	21	18	17	16	14	14
		PG	4	8	9	9	9	9	10
370	Commerce and Housing Credit	DL	4	4	4	4	4	4	4
		PG	106	77	59	61	64	67	70
400	Transportation	DL	1	1	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>
		PG	<u>a/</u>	0	0	0	0	0	0
450	Community and Regional Development	DL	1	1	1	1	1	1	1
		PG	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>
500	Education, Training, Employment, and Social Services	DL	2	1	2	2	2	2	2
		PG	9	9	9	9	10	10	10
550	Health	DL	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>
		PG	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>	<u>a/</u>
600	Income Security	DL	1	2	2	1	1	<u>a/</u>	<u>a/</u>
700	Veterans' Benefits and Services	DL	1	2	1	1	1	1	1
		PG	<u>35</u>	<u>33</u>	<u>27</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>27</u>
	Total	DL	43	42	38	37	35	34	34
		PG	160	141	116	117	121	126	131

SOURCE: Congressional Budget Office.

NOTES: DL = New direct loan obligations.  
PG = New primary loan guarantee commitments.

a. Less than \$500 million.



## APPENDIX C

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# FEDERAL RECEIPTS AND EXPENDITURES

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## IN THE NATIONAL INCOME AND

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## PRODUCT ACCOUNTS

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Both the budget and the federal sector of the National Income and Product Accounts (NIPA) measure the receipts and expenditures of the federal government. The national income accounts measure current income and production and are the most widely used indicator of current economic activity. As a rule, the NIPA federal sector is more useful than the budget for analyzing the economic impact of federal government activity. The NIPA estimates of federal government activity differ from those of the budget in four ways: timing of transactions, netting and grossing of receipts against spending, treatment of financial activities, and coverage.

Timing differences occur because the budget records transactions (except interest owed to the public) on a cash-paid or cash-received basis, while the NIPA federal sector may use a cash, accrual, or other basis, depending on the type of transaction. On the receipts side, the most important timing difference is the recording of corporate profit taxes in the NIPA at the time the tax liability is incurred, which may be months (or years) before the tax payment is deposited in the Treasury. On the expenditure side, the only major timing difference is that some large defense purchases are recorded in the NIPA at the time of delivery rather than at the time payment is made. Other timing differences are generally small.

Differences in netting and grossing arise because the budget treats certain types of receipts as offsets to outlays. For example, agency payments to the Civil Service Retirement Trust Fund and other federal employee benefit plans are counted as a negative outlay in the budget, exactly offsetting agency expenditures elsewhere. In the NIPA, this amount is added to both receipts and expenditures in order to provide a more accurate measure of personal income and outlays. Other netting and grossing adjustments in the NIPA are made for funds collected by the government in the course of business-type transactions--such as Medicare premiums, timber sales, and rents and royalties arising from the Outer Continental Shelf leases.

Lending and financial transactions that involve only the exchange of existing assets and liabilities are generally excluded from the NIPA, since they generate no current income or output. For example, the sale of a

governmental asset such as Conrail reduces the budget deficit but has no effect on the NIPA deficit. Similarly, direct lending by the Small Business Administration and other agencies is reflected in the budget but is excluded from the NIPA. Interest paid or received in the course of financial transactions, though, is reflected in the NIPA federal sector. The NIPA also records nonrecourse agricultural commodity loans as purchases of goods rather than lending.

Coverage differences largely reflect the exclusion of Puerto Rico, the Virgin Islands, and other territories for purposes of computing the gross national product and related data series in the NIPA.

The major differences between the budget and the federal sector in the NIPA are detailed in Table C-1. Since CBO's last report, a new reconciliation item has been added to the table. The Thrift Savings Plan established by the Federal Employees' Retirement System Act of 1986 (Public Law 99-335) is treated as a governmental fund in the budget. The NIPA, however, is likely to treat the Thrift Plan like private pension funds, which are considered part of the household sector. The budget, therefore, records agency contributions into the fund as intragovernmental payments and receipts, employee contributions as receipts from nonfederal sources, and disbursements from the fund as federal outlays. The NIPA, on the other hand, considers agency contributions to be a form of employee compensation (and, therefore, federal government purchases) and employee contributions and withdrawals to be private savings transactions. Excluding the receipts and disbursements of the Thrift Fund from the federal sector requires an additional reconciliation item which grows from \$1 billion in 1987 to \$3 billion by 1988.

Two major elements of the spending legislation adopted in October 1986 also affect the reconciliation table. Since the budget generally records transactions on a cash basis, both the delay of the final military paycheck of fiscal year 1987 into 1988 and the sale of governmental assets reduce the budget deficit. Since the NIPA records employee compensation on an accrual basis, the pay delay adds \$3 billion to the 1987 defense timing adjustment. Proceeds of asset sales, as discussed above, are excluded from the NIPA, thereby reducing the 1987 financial exclusion by \$8 billion. Table C-2 shows estimates of federal sector receipts and expenditures on a NIPA basis, consistent with the CBO baseline budget projections.

TABLE C-1.

RELATIONSHIP OF THE BUDGET TO THE FEDERAL SECTOR  
OF THE NATIONAL INCOME AND PRODUCT ACCOUNTS  
(By fiscal year, in billions of dollars)

	1987 Base	Projections				
		1988	1989	1990	1991	1992
<b>Receipts</b>						
Total Revenues <sup>a/</sup>	834	900	962	1,050	1,138	1,220
Differences						
Government contributions for employee retirement	35	40	44	47	50	54
Medicare premiums	7	8	9	9	10	11
Other netting and grossing	8	8	8	9	9	9
Geographic exclusions	-2	-2	-2	-2	-2	-2
Other	2	-2	1	4	1	1
Total Federal Sector NIPA Receipts	884	953	1,022	1,118	1,206	1,293
<b>Expenditures</b>						
Total Outlays <sup>a/</sup>	1,008	1,069	1,124	1,184	1,247	1,305
Differences						
Lending and financial transactions	-9	-13	-9	-6	-4	-3
Government contributions for employee retirement	35	40	44	47	50	54
Medicare premiums	7	8	9	9	10	11
Other netting and grossing	8	8	8	9	9	9
Defense timing adjustment	10	3	3	3	3	3
Federal employee thrift savings fund	1	3	3	3	3	3
Bonuses on outer continental shelf land leases	2	1	b/	b/	b/	b/
Geographic exclusions	-6	-6	-6	-7	-7	-8
Other	-2	-3	-2	1	-2	-2
Total Federal Sector NIPA Expenditures	1,054	1,111	1,175	1,244	1,309	1,372

SOURCE: Congressional Budget Office.

- a. Includes on-budget and off-budget activities.  
b. Less than \$500 million.

TABLE C-2.

PROJECTIONS OF BASELINE REVENUES AND EXPENDITURES  
ON A NATIONAL INCOME AND PRODUCT ACCOUNT BASIS  
(By fiscal year, in billions of dollars)

	1987 Base	Projections				
		1988	1989	1990	1991	1992
<b>Receipts</b>						
Personal Tax and Nontax Receipts	365	386	416	462	505	548
Corporate Profits Tax Accruals	121	135	142	156	168	180
Indirect Business Tax and Nontax Accruals	54	54	55	56	59	61
Contributions for Social Insurance	<u>345</u>	<u>377</u>	<u>409</u>	<u>443</u>	<u>475</u>	<u>504</u>
Total Receipts	884	953	1,022	1,118	1,206	1,293
<b>Expenditures</b>						
Purchases of Goods and Services	384	392	409	429	450	471
Defense	291	295	309	323	339	354
Nondefense	93	97	100	106	111	117
Transfer Payments	408	439	471	506	543	582
Grants-in-Aid to State and Local Governments	101	107	114	120	127	134
Net Interest Paid	135	140	147	152	155	153
Subsidies Less Current Surplus of Government Enterprises	<u>26</u>	<u>32</u>	<u>35</u>	<u>36</u>	<u>35</u>	<u>33</u>
Total Expenditures	1,054	1,111	1,175	1,244	1,309	1,372
<b>Deficit</b>						
Deficit	170	158	153	126	103	79

SOURCE: Congressional Budget Office.



## APPENDIX D

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# ANALYSIS OF CONGRESSIONAL BUDGET ESTIMATES

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Under the Congressional Budget Act of 1974, as amended, the Congress adopts one or more concurrent resolutions setting forth a budget plan for the coming year. Starting in fiscal year 1987, the budget resolution must meet the deficit target specified in the Balanced Budget and Emergency Deficit Control Act (Public Law 99-177).

Since fiscal year 1980, the actual budget deficit has consistently exceeded the estimates contained in the budget resolutions, as shown in Table D-1. Table D-2 divides the misestimates for the first budget resolutions into four major categories:

- o Economic Assumptions. Budget estimates may prove inaccurate if the economic assumptions on which they are based on are not borne out. An unexpectedly weak economy, for example, will reduce federal tax revenues and increase spending for unemployment compensation and welfare benefits.
- o Legislative Assumptions. In drafting a budget resolution, the Budget Committees must make assumptions about the timing and likely effects of pending tax legislation and spending proposals. If the laws enacted differ from those assumed, the resolution estimates are likely to be inaccurate.
- o Administrative Assumptions. Unanticipated regulatory and other administrative actions or inactions by federal agencies can cause unexpected increases or decreases in outlays and revenues.
- o Technical Assumptions. Some differences between estimates and outcomes are the result of imprecise estimating methods and other factors that do not fit into the categories above. For example, no one can predict exactly how many people will apply for Social Security benefits next year or precisely how large payroll tax collections will be, even if the economic and legislative assumptions of the budget resolution are completely borne out.

TABLE D-1. CONGRESSIONAL BUDGET RESOLUTIONS AND  
ACTUAL BUDGET TOTALS (In billions of dollars)

Fiscal Year	Revenues	Outlays	Surplus or Deficit (-)
Fiscal Year 1976			
First resolution	298.2	367.0	-68.8
Second resolution	300.8	374.9	-74.1
Actual	299.2	364.8	-65.6
Fiscal Year 1977			
First resolution	362.5	413.3	-50.8
Second resolution	362.5	413.1	-50.6
Third resolution	347.7	417.5	-69.8
Third resolution amended	356.6	409.2	-52.6
Actual	356.9	401.9	-45.0
Fiscal Year 1978			
First resolution	396.3	461.0	-64.6
Second resolution	397.0	458.3	-61.3
Actual	401.1	449.9	-48.8
Fiscal Year 1979			
First resolution	447.9	498.8	-50.9
Second resolution	448.7	487.5	-38.8
Revised second resolution	461.0	494.5	-33.4
Actual	465.9	493.7	-27.7
Fiscal Year 1980			
First resolution	509.0	532.0	-23.0
Second resolution	517.8	547.6	-29.8
Revised second resolution	525.7	572.7	-47.0
Actual	520.1	579.6	-59.6
Fiscal Year 1981			
First resolution	613.8	613.6	0.2
Second resolution	605.0	632.4	-27.4
Revised second resolution	603.3	661.4	-58.0
Actual	602.6	660.5	-57.9
Fiscal Year 1982			
First resolution	657.8	695.4	-37.6
Revised second resolution	628.4	734.1	-105.7
Actual	617.8	728.4	-110.7

(Continued)

TABLE D-1. (Continued)

Fiscal Year	Revenues	Outlays	Surplus or Deficit (-)
Fiscal Year 1983			
First resolution	665.9	769.8	-103.9
Revised second resolution <u>a/</u>	604.3	807.4	-203.1
Actual	600.6	796.0	-195.4
Fiscal Year 1984			
First resolution <u>b/</u>	679.6	851.2	-171.6
Revised second resolution	672.9	845.6	-172.7
Actual	666.5	841.8	-175.3
Fiscal Year 1985			
First resolution <u>c/</u>	750.9	932.0	-181.2
Revised second resolution <u>c/</u>	736.5	935.9	-199.4
Revised second resolution <u>d/</u>	736.5	946.3	-209.8
Actual <u>c/</u>	734.1	936.8	-202.8
Actual <u>d/</u>	734.1	946.3	-212.3
Fiscal Year 1986			
First resolution <u>d/</u>	795.7	967.6	-171.9
Actual	769.1	989.8	-220.7
Fiscal Year 1987			
First resolution <u>d/</u>	852.4	995.0	-142.6

SOURCE: Congressional Budget Office.

NOTE: Actual totals have been adjusted where necessary to agree with the budgetary treatment of various items for the budget resolutions and may, therefore, differ from the totals shown elsewhere in this report. Data for fiscal year 1984 and earlier years exclude outlays (primarily Federal Financing Bank, Strategic Petroleum Reserve, and Postal Service) that were considered off-budget before enactment of the Balanced Budget and Emergency Deficit Control Act of 1985.

- a. Outlays exclude amounts reserved pursuant to Section 2 of the Budget Act.
- b. Adjusted for enactment of reserve fund programs.
- c. On-budget only; see note.
- d. On- and off-budget combined; see note.

The estimates for fiscal years 1980 through 1982 were described in detail in the CBO special study, *An Analysis of Congressional Budget Estimates for Fiscal Years 1980-1982* (June 1984). A forthcoming CBO report will provide details on the estimates for fiscal years 1983 through 1986.

Table D-2 shows that all four sources of error have tended to contribute to underestimating the federal deficit. The economic assumptions were too optimistic every year. (In 1982 and 1986, the budget resolution was based on Administration economic assumptions; in the other years, CBO or modified CBO assumptions were used). Inaccurate legislative and administrative assumptions each contributed to underestimating the deficit in every year but one. And the technical assumptions caused the deficit to exceed the estimate in all but two years.

The net effect of these four factors is a fairly consistent tendency to overestimate revenues and underestimate outlays. Actual revenues fell short of the budget resolution estimates in six years out of seven. Actual outlays exceeded the estimates with the same frequency. For both revenues and outlays, the outcomes differ from the estimates by an average of 3.5 percent. These errors are magnified in the deficit, which exceeded the estimates by an average of \$48 billion, or by almost half.

TABLE D-2. SOURCES OF DIFFERENCES BETWEEN ACTUAL BUDGET TOTALS AND FIRST BUDGET RESOLUTION ESTIMATES FOR FISCAL YEARS 1980-1986 (In billions of dollars)

Differences	1980	1981	1982	1983	1984	1985	1986
<b>Revenues</b>							
Economic Assumptions	8.4	5.0	-51.9	-58.0	4.5	-20.0	-23.0
Legislative Assumptions	6.2	-3.7	13.0	-4.6	-13.7	-0.2	-1.5
Administrative Assumptions	--	--	--	--	--	--	--
Technical Assumptions	<u>-3.5</u>	<u>-12.6</u>	<u>-1.1</u>	<u>-2.7</u>	<u>-3.9</u>	<u>3.3</u>	<u>-2.1</u>
Total Differences	11.1	-11.2	-40.0	-65.3	-13.1	-16.8	-26.6
<b>Outlays</b>							
Economic Assumptions	12.4	6.4	24.1	0.5	7.1	-5.2	-12.1
Legislative Assumptions	12.4	17.9	1.1	15.6	1.6	19.1	11.8
Administrative Assumptions	7.2	6.6	0.1	2.0	-0.1	3.8	2.4
Technical Assumptions	<u>15.6</u>	<u>16.0</u>	<u>7.7</u>	<u>8.1</u>	<u>-18.0</u>	<u>-12.9</u>	<u>20.1</u>
Total Differences	47.6	46.9	32.9	26.2	-9.4	4.8	22.2
<b>Deficit</b>							
Economic Assumptions	4.0	1.4	76.0	58.5	2.7	14.8	10.9
Legislative Assumptions	6.2	21.6	-11.9	20.2	15.3	19.3	13.2
Administrative Assumptions	7.2	6.6	0.1	2.0	-0.1	3.8	2.4
Technical Assumptions	<u>19.1</u>	<u>28.6</u>	<u>8.8</u>	<u>10.8</u>	<u>-14.1</u>	<u>-16.2</u>	<u>22.2</u>
Total Differences	36.6	58.1	73.0	91.5	3.7	21.6	48.8

Source: Congressional Budget Office.

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## APPENDIX E

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### ESTIMATES OF POTENTIAL OUTPUT

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This appendix briefly presents CBO's current estimates of potential output, based on GDP instead of GNP, and benchmarked to 1982 instead of 1972.

#### SPECIFICATION

Potential output,  $Y^*$ , was assumed to satisfy the Okun equation,

$$(1) \ln(Y/Y^*) = a_1(U-U^*) + e,$$

where

$Y$  = real GDP (1982 dollars)

$U$  = civilian rate of unemployment,

$U^*$  = stable-inflation rate of unemployment, 1/ and

$e$  = disturbance term.

It was also assumed that  $Y^*$  grows smoothly over several subperiods of time according to

$$(2) \ln(Y^*) = b_0 + b_1T53 + b_2T57 + b_3T60 \\ + b_4T69 + b_5T73 + b_6T80 + b_7T81,$$

where the right-hand variables are separate time trends beginning at the cyclical peaks, 1953:2, 1957:3, 1960:2, 1969:4, 1973:4, 1980:1, and 1981:3, respectively. Substituting (2) into (1) yields:

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1. The series for the stable-inflation rate of unemployment was obtained from Robert J. Gordon, *Macroeconomics* (New York: Little, Brown, 1984), Appendix B, Table B2, Column 6.

$$\begin{aligned}
 (3) \quad \ln(Y) &= \ln(Y^*) + a_1(U-U^*) + e \\
 &= b_0 + b_1T53 + b_2T57 + b_3T60 + b_4T69 + b_5T73 \\
 &\quad + b_6T80 + b_7T81 + a_1(U-U^*) + e.
 \end{aligned}$$

Potential output was calculated from the fitted values of equation (3), assuming that  $U = U^*$  and  $e = 0$ .

The components of potential output growth also were calculated, based on the GDP identity,

$$(4) \quad Y = N(E/L)(L/N)(Y'/H')(H'/E')(E'/E)(Y/Y'),$$

where

- $Y$  = real GDP,
- $N$  = civilian population 16 years and older,
- $E$  = civilian employment (household survey),
- $L$  = civilian labor force,
- $Y'$  = private nonfarm business output (less housing),
- $H'$  = hours worked in the private nonfarm business sector, (establishment survey), and
- $E'$  = employment in the private nonfarm business sector (establishment survey).

In each case, the regression equation was identical to (3) except for a different dependent variable. By this construction, the estimated growth rates of the components of potential output sum to the estimated growth rate of potential output.

## REGRESSION RESULTS

Table E-1 presents the regression results for equation (3) and for the components of potential growth. In each case, the seven time-trend coefficients (multiplied by 100) are the potential growth rates of the



TABLE E-1. EQUATIONS FOR ESTIMATING POTENTIAL OUTPUT AND ITS COMPONENTS

Dependent Variable	Intercept	T53	T57	T60	T69	T73	T80	T81	(U-U*)
ln(Y)	7.2202 (1626)	.0254 (16.7)	.0308 (18.7)	.0363 (71.1)	.0310 (26.9)	.0296 (39.7)	.0175 (5.0)	.0254 (21.9)	-.0194 (22.3)
ln(N)	4.6691 (7149)	.0118 (52.8)	.0135 (55.8)	.0152 (202)	.0237 (140)	.0188 (172)	.0148 (29.0)	.0117 (68.9)	.0001 (0.7)
ln(E/L)	-.0532 (154)	.0003 (2.9)	-.0006 (4.5)	-.0006 (14.8)	-.0005 (5.2)	-.0001 (1.0)	-.0008 (2.9)	.0001 (0.7)	-.0107 (158)
ln(L/N)	-.5389 (198)	.0064 (6.8)	-.0064 (6.3)	.0011 (3.6)	.0049 (6.9)	.0077 (16.8)	.0026 (1.2)	.0037 (5.2)	-.0013 (2.5)
ln(Y'/H')	2.4427 (360)	.0172 (7.4)	.0280 (11.1)	.0186 (23.9)	.0124 (7.1)	.0083 (7.3)	-.0112 (2.1)	.0137 (7.7)	-.0029 (2.2)
ln(H'/E')	.5743 (220)	-.0060 (6.7)	-.0008 (0.9)	-.0076 (25.4)	-.0053 (7.8)	-.0037 (8.4)	.0062 (3.0)	-.0005 (0.7)	-.0070 (13.7)
ln(E'/E)	-.2086 (71.3)	.0027 (2.7)	-.0022 (2.0)	.0095 (28.2)	.0018 (2.4)	.0015 (3.1)	.0042 (1.8)	-.0002 (0.2)	-.0045 (7.9)
ln(Y/Y')	.3348 (140)	-.0070 (8.6)	-.0007 (0.8)	.0001 (0.3)	-.0061 (9.8)	-.0029 (7.3)	.0018 (0.9)	-.0031 (5.0)	.0069 (14.7)
ln(E)	4.0771 (1390)	.0185 (18.5)	.0065 (6.0)	.0157 (46.6)	.0281 (37.0)	.0265 (53.7)	.0166 (7.2)	.0155 (20.2)	-.0119 (20.7)
ln(Y/E)	3.1432 (540)	.0069 (3.5)	.0243 (11.3)	.0206 (30.8)	.0028 (1.9)	.0032 (3.2)	.0009 (0.2)	.0099 (6.5)	-.0075 (6.6)

dependent variable from one cyclical peak to the next. In the case of the last time trend, the growth rate covers the 1981:3 to 1986:3 period. The bottom panel of Table E-1 divides the growth rate of potential output into only two components--the growth rate of employment and the growth rate of output per employed person.

According to the results in Table E-1, the exponential growth rate of potential output rises from 2.54 percent during 1953:2-1957:3 to 3.63 percent during 1960:2-1969:4. Then it declines steadily to only 1.75 percent during 1980:1-1981:3. For the 1981:3-1986:3 period, potential growth is estimated to be 2.54 percent. <sup>2/</sup> The rising growth rate between 1953:2-1957:3 and 1960:2-1969:4 reflects an improvement in the growth of output per employee (productivity), while the decline between 1960:2-1969:4 and 1980:1-1981:3 reflects a deterioration. The upturn in potential growth since 1981:3 is attributed to a rebound in productivity growth. Table E-2 presents the fiscal year estimates of nominal potential GNP, along with corresponding estimates of the standardized-employment deficit. <sup>3/</sup>

## CONCLUSION

There are many approaches to estimating potential output. <sup>4/</sup> The one presented in this Appendix is representative of those based on an Okun equation, and provides a breakdown of potential growth. <sup>5/</sup> Its major shortcoming is that the use of time trends fails to "explain" potential growth, and does not adequately take into account the time series properties of macroeconomic variables such as output and unemployment. Nevertheless, it does provide a benchmark level of output consistent with estimates of the stable-inflation rate of unemployment.

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2. These exponential growth rates differ slightly from the discrete-time growth rates reported in Chapter III.
  3. Estimates of potential GNP are obtained by adding the difference between actual GNP and GDP to the estimates of potential GDP.
  4. For estimates based on a production function that includes the capital stock, see Richard W. Kopcke, "Potential Growth, Productivity, and Capital Accumulation," Federal Reserve Bank of Boston, *New England Economic Review* (May/June 1980), pp. 22-41.
  5. For comparison, see Thomas M. Holloway, "Okun's Law Revisited," Bureau of Economic Analysis, Discussion Paper 4 (May 1986).

TABLE E-2. HISTORICAL ESTIMATES OF POTENTIAL GNP  
AND THE STANDARDIZED EMPLOYMENT DEFICIT

Fiscal Years	Potential GNP (In Billions of Dollars)	Stable-Inflation Rate of Unemployment	Standardized Employment Deficit (-)	
			In Billions of Dollars	As Percent of Potential GNP
1956	408.3	5.1	2.5	0.6
1957	434.6	5.1	2.7	0.6
1958	459.4	5.0	1.7	0.4
1959	484.0	5.1	-9.5	-2.0
1960	510.6	5.2	2.8	0.6
1961	534.8	5.2	3.4	0.6
1962	564.6	5.3	-2.9	-0.5
1963	596.6	5.4	-0.8	-0.1
1964	627.8	5.5	-4.7	-0.8
1965	665.0	5.6	-2.6	-0.4
1966	709.3	5.6	-11.2	-1.6
1967	760.5	5.6	-17.0	-2.2
1968	816.4	5.6	-34.5	-4.2
1969	892.3	5.6	-7.8	-0.9
1970	976.7	5.6	-6.8	-0.7
1971	1,060.7	5.7	-19.8	-1.9
1972	1,155.4	5.8	-19.8	-1.7
1973	1,252.9	5.8	-21.7	-1.7
1974	1,398.4	5.9	-11.0	-0.8
1975	1,584.7	6.0	-32.9	-2.1
1976	1,771.0	6.0	-46.5	-2.6
1977	1,975.8	6.0	-34.6	-1.8
1978	2,178.4	5.9	-53.3	-2.4
1979	2,447.5	5.9	-39.9	-1.6
1980	2,733.8	5.9	-51.6	-1.9
1981	3,054.9	6.0	-49.4	-1.6
1982	3,357.2	6.0	-55.0	-1.6
1983	3,580.5	6.0	-112.7	-3.1
1984	3,811.0	6.0	-136.2	-3.6
1985	4,035.2	6.0	-175.5	-4.3
1986	4,255.2	6.0	-186.7	-4.4

SOURCES: Congressional Budget Office and Robert J. Gordon, *Macroeconomics* (New York: Little, Brown, 1984), Appendix B, Table B2, Column 6.